

Photochemical reaction of $\text{Mo}(\text{CO})_6$ with Et_2SiH_2 : spectroscopic characterization and crystal structure of the bis $\{(\mu\text{-}\eta^2\text{-hydridodiethylsilyl})\text{tetracarbonylmolybdenum(I)}\}$ complex $[\{\text{Mo}(\mu\text{-}\eta^2\text{-H-SiEt}_2)(\text{CO})_4\}_2]$.

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Streszczenie

Photolysis of $\text{Mo}(\text{CO})_6$ in *n*-heptane solution creates a coordinatively unsaturated d^6 species, which interacts with the Si-H bond of Et_2SiH_2 and leads to the formation of Mo-H and Mo-Si bonds. The formation of a Mo-H bond was corroborated by ^1H NMR spectroscopy due to the detection of a high-field resonance at $\delta = -8.33$ flanked by ^{29}Si satellites. The formation of Mo-Si bonds was confirmed by the detection of two sets of ^{29}Si satellites on the hydride signal, which provided $J_{\text{Si-H}} = 57$ and 33 Hz, and by the $^{29}\text{Si}\{^1\text{H}\}$ NMR spectrum, which revealed a resonance at $\delta = 207.7$. The latter signal in the ^{29}Si NMR spectrum was observed as a doublet of quintets with $^1J_{\text{Si-H}} = 58$ Hz and $^2J_{\text{Si-H}} = 41$ Hz. The ^{95}Mo NMR spectrum showed at high field a resonance at $\delta = -3785$, characteristic for seven-coordinate molybdenum compounds. The molecular structure of a novel bis $\{(\mu\text{-}\eta^2\text{-hydridodiethylsilyl})\text{tetracarbonylmolybdenum(I)}\}$ complex, $[\{\text{Mo}(\mu\text{-}\eta^2\text{-H-SiEt}_2)(\text{CO})_4\}_2]$, was established by single-crystal X-ray diffraction studies. The molybdenum hydride observed in the ^1H NMR spectrum was located in the structure at a chemically reasonable position between the Mo and Si atoms of the Mo-Si bonds of the bridging silyl ligand with a Si-H bond length of 1.615(3) Å and that of the Mo-H bond amounting to 1.786(5) Å.

Słowa kluczowe

Silicon, Anions, Ligands, Molybdenum, Resonance structures

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